

REMARKS

Claims 1, 17 and 31 have been rejected under 35 U.S.C. §102(b) as anticipated by Gaddy (U.S. Patent No. 5,006,179), or alternatively under 35 U.S.C. §103(a) as obvious over Gaddy in view of Pollard (U.S. Patent No. 6,034,322). In addition, Claims 12, 14 and 16 have been rejected as obvious over Gaddy in view of Pollard, and Claims 1, 12, 14, 16, 17, 31 and 32 have been rejected as unpatentable over Webb et al (U.S. Patent No. 3,422,213) in view of Pollard and Gaddy. However, for the reasons set forth hereinafter, Applicants respectfully submit that all claims which remain of record herein, including new Claim 33, distinguish over the cited references, and are allowable.

The present invention is directed to a “solar cell interconnecting element for connecting between adjacent solar cells”. As defined in Claim 1, it includes first and second connection areas that are formed in a metal strip, and comprise “tabs that are configured and disposed so as to be connectable to respective ones of said adjacent solar cells, forming a conductive connection between said solar cells”. A centrally situated compensation section is formed in the metal strip as well, integrally with and intermediate the connection areas. Claim 1 further specifies that the compensation section is “configured to compensate for mechanical or other tensions due to movement between said adjacent solar cells”.

As further recited in Claim 1, the compensation section comprises a single central opening which is intermediate to the first and second connection areas, and is delimited by a surrounding marginal area of the metal strip. Finally, Claim 1 also recites that, "the compensation section and the central openings are one of round, oval and polygonal". New Claim 33 is organized differently, but includes each of the limitations set forth above, albeit in different language.

The features of the invention as described in the preceding paragraph are not found in any of the cited references. The Gaddy patent, in particular, discloses an interconnect for electrically connecting adjacent solar cells disposed in a solar cell array. To that extent, it is similar to the present invention. However, the "interconnect" as described in Gaddy differs fundamentally from that of the present invention. Most significantly, the interconnect in Gaddy is not formed as "a unitary continuous segment" of a metal strip, as recited in Claim 1. Rather, as discussed, for example, in the specification at Column 4, lines 10-31, it comprise three separate components, including first and second "connecting parts" and a "stress relief part". As noted, for example, at Column 4, lines 13-31, the first and second connecting parts are connected to the stress relief part by a "solder type bond", or alternatively by a snap fit, or a non-insulated adhesive bond.

The latter feature of the interconnect element in Gaddy is an important aspect of the structure defined therein in that, as discussed in the specification

at Column 5, line 64 through Column 6, line 38, the first and second connecting parts 40 and 50 on the one hand, and the stress relief part 32, on the other hand, are to be made of a different material. Specifically, the connecting parts 40 and 50 are formed of a "material having a coefficient of thermal expansion substantially the same as the coefficient of thermal expansion of silicon since the solar cells are formed of silicon". As a result, as noted at Column 6, lines 1-8, the connecting parts 40 and 50 expand and contract at the same rate during thermal cycling as do the solar cells, preventing stress concentrations in the connection between the first and second connecting parts and the electrical contacts of the solar cells themselves.

On the other hand, as noted in the specification at Column 6, lines 21-29, the stress relief part 32 is to be "formed of a material which is relatively strong at the temperature of the environment to which the solar cell interconnect will be exposed such that it can withstand repeated mechanical cycling. For example, while the first and second connecting parts may be made of molybdenum, INVAR, or KOVAR, the stress relief part 32 may be made of beryllium copper.

As noted at Column 6, lines 31-38, the above three-part construction is considered advantageous because it facilitates repairs. In particular, the specification states that such construction permits the "individual parts of the interconnect to be removed from the remaining parts of the interconnect when

replacing a broken or damaged cell in the solar cell array". Accordingly, Gaddy affirmatively teaches away from forming the connecting parts and the stress relief part as integral portions of a metal strip, in order to achieve the advantages of the three-part construction described above.

It is noteworthy in this regard that the part of the interconnect device in Gaddy which corresponds most closely to the "compensation section" as defined in Claim 1 is the "stress relief part 32". As noted at Column 3, line 68 through Column 4, line 9, however, the stress relief part is provided in the form of an "elongated" member which is "disposed substantially parallel to adjacent edges of the first and second solar cells" between which it is situated. (See Figure 6, element 32. See also, Column 3, lines 57-62.) The stress relief part 32 itself is not connected to either of the adjacent solar cells, nor is it integrally formed with the connection parts 40, 50, which provides such a connection. Moreover, it does not comprise "a single central opening" in a metallic strip, which is defined by a surrounding marginal area, with the compensation section itself and the central opening being round, oval or polygonal, as recited in Claim 1.

In regard to the latter features of the invention, the Office Action at page 3 refers in particular to the second "connecting part" 50, which is illustrated in Figures 3 and 4, and described in the specification at Column 4, lines 1-9. The rejection of Claims 1, 17 and 31 over Gaddy is premised on the proposition that the connecting part 50 constitutes a solar cell connector such as recited in Claim

1 (prior to amendment), and that the respective projections at the top and bottom of Figure 4 correspond to the first and second connection areas as defined in Claim 1. Moreover, while the Office Action does not expressly so state, it appears that the centrally situated compensation section of Claim 1 is equated to the oval portion of the second connecting part 50 in Figure 4. Thus, the Office Action indicates that the compensation section comprises a single central opening, which is intermediate the first and second connection areas and is one of round, oval and polygonal.

Applicants respectfully submit, however, that the structure relied on in the Office Action, being that of the second connecting part 50 as illustrated in Figures 3 and 4 of the Gaddy patent, does not constitute “a solar cell interconnecting element for connecting between adjacent solar cells”. In fact, insofar as the specification indicates, the second connecting part 50 does no more than to connect one of the solar cells with the “stress relief part” 32. It does not interconnect adjacent solar cells. Moreover, it does not include first and second connection areas which comprise tabs “that are configured and disposed so as to be connectable to respective ones of said adjacent solar cells, forming a conductive connection between said solar cells”. Finally, Applicants note that the centrally situated oval portion of the second connecting part 50 in Gaddy does not constitute a “compensation section” which is configured to compensate for mechanical or other tensions due to movement between said adjacent solar

cells as further recited in Claim 1. Although the disclosure in Gaddy appears to contain no explanation for the particular shape or structure of the second connecting part 50, clearly it is not connected between adjacent solar cells, and is not configured to compensate for mechanical or other tensions due to movement between the adjacent solar cells. Rather, the latter function is performed by the stress relief part 32. Accordingly, Applicants respectfully submit that the solar cell interconnecting element defined in Claim 1 as amended is not readable on the second connecting part 50 in Gaddy, and that Claim 1 distinguishes over Gaddy for the reasons set forth above. New Claim 33 also distinguishes over Gaddy, for the same reasons.

Moreover, in view of the fundamental differences discussed above, Applicants respectfully submit that independent Claims 1 and 33 also distinguish over any combination between Gaddy and Pollard. In particular, Applicants note that the structural differences between the "interconnect" in Gaddy and the present invention as defined in Claims 1, 12, 14 and 16 more extensive than the three differences referred to in items a., b. and c. on page 5 of the Office Action. Moreover, Pollard does not teach or suggest any features which could be combined with the interconnect structure of Gaddy in order to replicate the present invention.

With regard to the rejection of Claims 1, 12, 14, 16, 17, 31 and 32 as unpatentable over Webb et al in view of Pollard and Gaddy, Applicants note that

this ground of rejection differs from the rejection of Claims 1, 17, 31 and 32, as well as Claims 12, 14, and 16 in the previous Office Action by the addition of the Gaddy patent. As noted in the currently outstanding Office Action, the previous rejections were withdrawn in view of the remarks contained in the Response to Final Office Action submitted November 20, 2008. However, for the reasons noted in the detailed discussion of the Gaddy patent, as set forth above, it is apparent that Gaddy provides no further teaching which would support a modification of the Webb et al and Pollard patents in order to replicate the present invention, due to the fundamental differences in the structure of the "interconnect" as disclosed in Gaddy.

In particular, at page 10, the Office Action indicates that it would have been obvious to modify the compensation section and the central opening described by Webb et al such that the compensation section and the central opening are round, oval or polygonal. However, as discussed previously herein, Gaddy does not disclose an "interconnect" having a central opening that forms a compensation section which is round, oval or polygonal, and thus does not suggest such a modification. Even more importantly, however, as pointed out at page 3, lines 6-10 of the Remarks in Applicant's Response After Final Rejection, and at page 8, lines 8-12 of the Amendment dated June 30, 2008, due to the structure and method of fabrication of the connector strips in Webb et al, it would be difficult or impossible to modify the Webb et al structure to provide a

round, oval or polygonal central opening. This argument would appear to have been found persuasive, because the previous rejection based on such a proposed modification of Webb et al was withdrawn.

Specifically, as noted at Column 2, lines 31-35 of Webb et al, the stress relieved area described therein is formed "by chemically milling the connector strips", so that "areas may be formed in the strip which take the form of short strands or sections which connect adjacent portions of the flat strip to thereby permit relative movement between adjacent sections of the strip." Accordingly, the "stress relieved area" as seen for example, in Figure 2, has a shape which is clearly not round, oval or polygonal. Rather, the open area in the central portion of the stress relieved area has a shape which could best be described as having curved sides and pointed ends. Since this particular shape results from the manner in which the connector strip in Webb et al is divided into a plurality of "strand-like portions", it can be seen that, the structure defined in Webb et al could not be modified to achieve a round, oval or polygonal central opening without extensive and fundamental modification of both its structure and its manner of fabrication. Applicants respectfully submit that nothing contained in either Pollard or Gaddy teaches or suggests a manner in which such a modification might be achieved. Accordingly, Applicants respectfully submit that independent Claims 1 and 33, and therefore all claims of record, distinguish over the cited combination of Webb et al, Pollard and Gaddy.

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In light of the foregoing remarks, this application should be in consideration for allowance, and early passage of this case to issue is respectfully requested. If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #010408.52444US).

Respectfully submitted,



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